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Geographic components and eco-tourism in the Aswan region, southern Egypt

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Abstract

Aswan has a rich natural heritage along its geographical location, varies from the wild environment with its topography and geological features, and the river environment on both sides of the Nile. Both of which provide a variety of natural heritage resources, including the geological formations that show the bottom of the river completely exposed between the High Dam and the Aswan Dam, as well as the surface geological phenomena of elevations, hills, valleys, deserts and sand dunes. In addition to the ecosystem represented in, plant reserves, the Nile islands, and floodplains. All of them are exceptional phenomena's natural and deserve to be a support in the sustainable economic development especially under the official orientations supporting tourism. The research aims to focus on the importance of natural formations of ecotourism in Aswan

Keywords: **Tourism, Sustainable development, Aswan, Natural formation, Nature reserves**

Introduction:

The concept of geological and environmental tourism: It is one of the new forms of sustainable tourism and is based on using sites with geological characteristics and intrinsic values without being exposed to damage or destruction. While ecotourism and wildlife deals with the biotic features (living organisms) of an area. Therefore, in recent years, emphasis has been placed on the importance of non-vital tourism activities, and new theories, legislation and laws have emerged to preserve the geological and environmental heritage in many countries, including Arab countries. Interest in geotourism was not gained until the nineties of the last century. Therefore, it is considered a benefit to the national income, which is why the term Geopark appeared. In the end, the International Congress of Geotourism in Portugal 2011 came out with a definition of geotourism as (tourism that perpetuates and enhances the identity of the region and its geological, aesthetic, cultural and recreational characteristics for local residents and tourists). Therefore, the definitions overlapped, so we once again mention that it is Geotourism.

The research hypothesis and objectives can be précised in the following points:

-Choosing the study area: It includes the city of Aswan with its northern to southern borders, the eastern and western edges, and the watercourse between them. Aswan Governorate is located between latitudes 22 degrees and 25 degrees 30 north and longitudes 31 degrees 30 and 33 degrees east.

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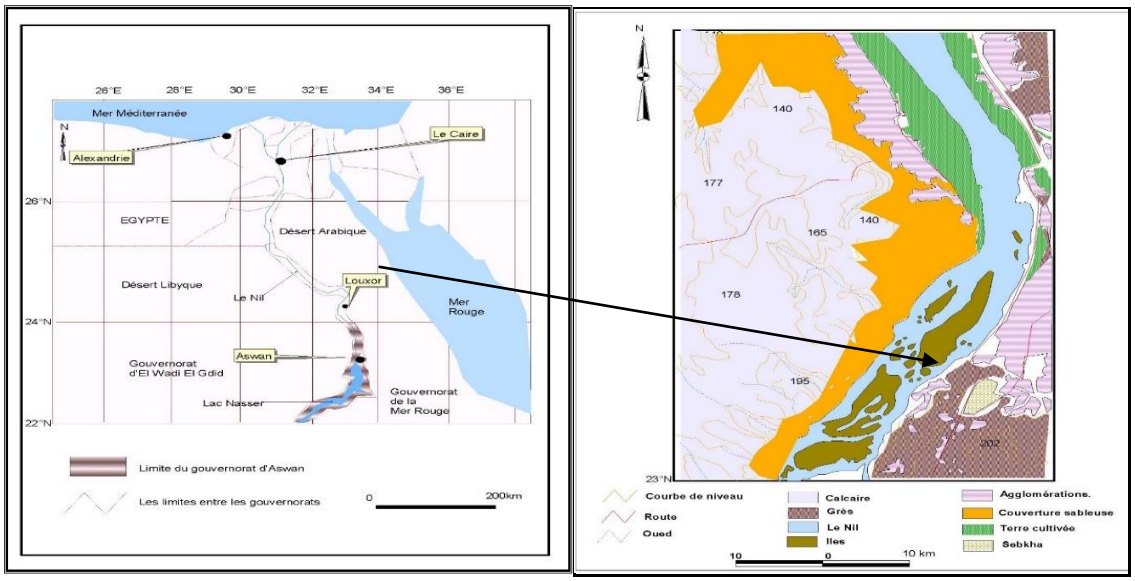
-The research problem: Discussing the most important natural data of all kinds (geological and environmental) and developing maps of them, which could be a reason for tourist attraction for the region throughout the year, away from historical tourism.

-The research aim to shed light on the importance of geological formations, tourist attraction and marketing for natural tourism in Aswan, the establishment of a global GEOPARKS, and to highlight the role of geological formations as a natural heritage in revitalizing eco-tourism in Aswan for the attention of those responsible for tourism activity and their preservation as a resource for sustainable development, where all attention is focused. The historical monuments in Aswan without taking into account the natural phenomena in the region, which with a little attention can constitute a tourist attraction factor closely related to historical tourism in the region. Making an atlas of the geological regions in Aswan.

1-Study area (location):

With an area of 62 thousand km2, an elevation of 84 meters above sea level, and a population of 1,300,000 people, the Aswan region is located in the south of the Arab Republic of Egypt, between latitudes 22-24 north and longitudes 32-43 degrees east



(Fig. 1): The geographical location of the study area

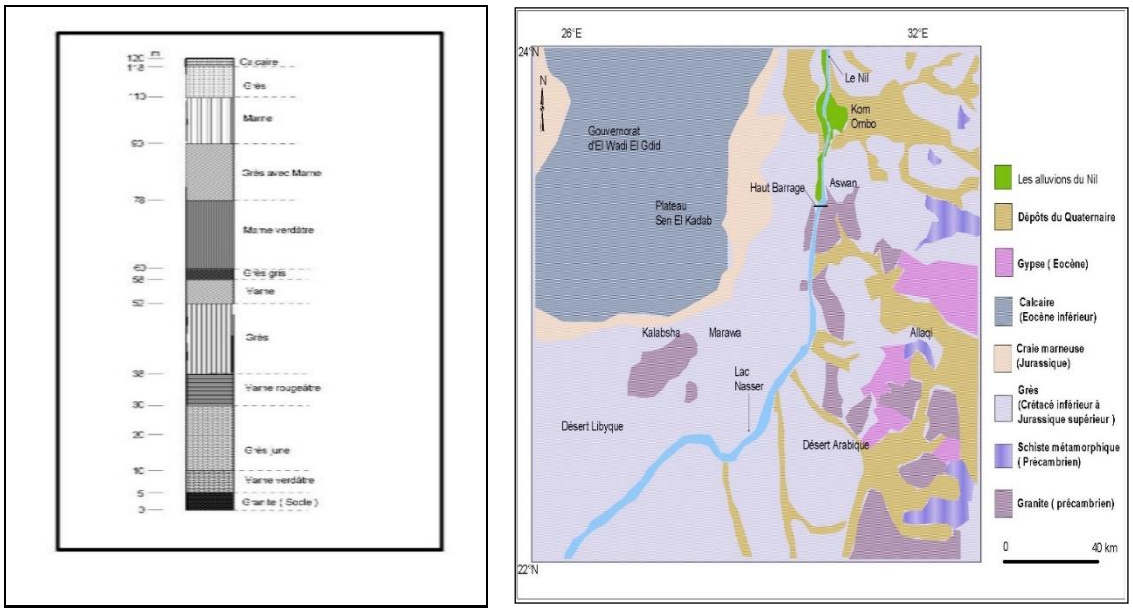
Aswan and the course of the Nile River bisect it longitudinally, so it includes various geological formations between its banks, including igneous, metamorphic, and sedimentary formations, in addition to the riverbed and its sediments represented by the river islands and its floodplain. The construction of the Aswan Dam in 1902 and the High Dam in 1969, and the resulting presence of Lake Nasser, had a major impact on the development and change of the general geomorphological appearance in the region and gave it a kind of natural and even human environmental change, especially related to the tourism sector in the region.

2- Geological formations and their impact on eco-tourism:

The rocks exposed in Egypt are divided into two main types: basement rocks and sedimentary cover. The Precambrian basement of Egypt, Ethiopia, and Somalia, which together formed the Arabian Shield before the Red Sea Rift (Hermina, 1989). The basement rocks in Egypt formed during three distinct periods. The first is in the middle or end of the era with the reactivation of the Upper Proterozoic at Jebel Uwaynat. The second is a period of formation and reactivation in the main crust, the third period is at the end of the Proterozoic.

In the Proterozoic, the Arabian basement experienced a series of extension, compression, and contraction movements, three main stages of evolution. The first, very ancient stage (middle Proterozoic) represents only the remains of ancient oceanic crust. The second, dating between 950 and 600 million years ago (Upper Proterozoic), was mainly characterized by compressional movements; Gondona was actually composed of two separate continents that collided along a large suture known as the Mozambique Belt. The series of layers of volcanic deposits found today on both sides of the Red Sea are formed at the edge of island arcs on the Nubian Shield in Sudan and Egypt.

The sedimentary formations (Paleozoic to Pleistocene), which cover the basement, consist of three main lithological parts. The lower part is clastic (Paleolithic to lower Cretaceous), part is middle limestone (Cenomanian to end of Eocene), and upper clastic part is from Oligocene to Holocene (Said, 1962 and Morgan, 1990).



(Figure 2): Geological map and geological column of the study area (Source: Egyptian Geological Survey)

2-1.Precambrian Formation:

Metamorphic rocks: The stratigraphic section below in Aswan shows the sedimentary layers that dominate the region. Metamorphic rocks in the Aswan area include gneiss and paraphyseal rocks interbedded by pegmatite. Gneiss is considered more abundant in Aswan

rocks. Both are located on vast areas near Mount Sheikh Haroun and Jbeil Drissa. Metamorphic gneiss rocks are among the most common metamorphic rocks because they form large blocks near Jabal Sheikh Haroun and Jbeil Drissa, where many blocks of these oval rocks are observed scattered in the granite.

These rocks are characterized by the absence of hornblende and the presence of biotite as an important component or in various groups.

(Photo 1, right and left): Gneiss and schist granite formations in the Nile Islands in Aswan

2-2.Granodiorite:

The Aswan region constitutes a large area of granodiorite formations extending from north to south. In the northern part of the granite, Jebel Ibrahim Pasha covers sector. The granodiorite massif contains large oval pockets of dark metamorphic rocks usually represented by different minerals such as hornblende, and take the following directions NNW-SSE.

The granite is perfectly observed in Jabal Al-Sulai'i. It consists of a single granite block smooth from the top, similar to baldness of the head, and reaches a height of about 200 meters from the base rocks of white granite.

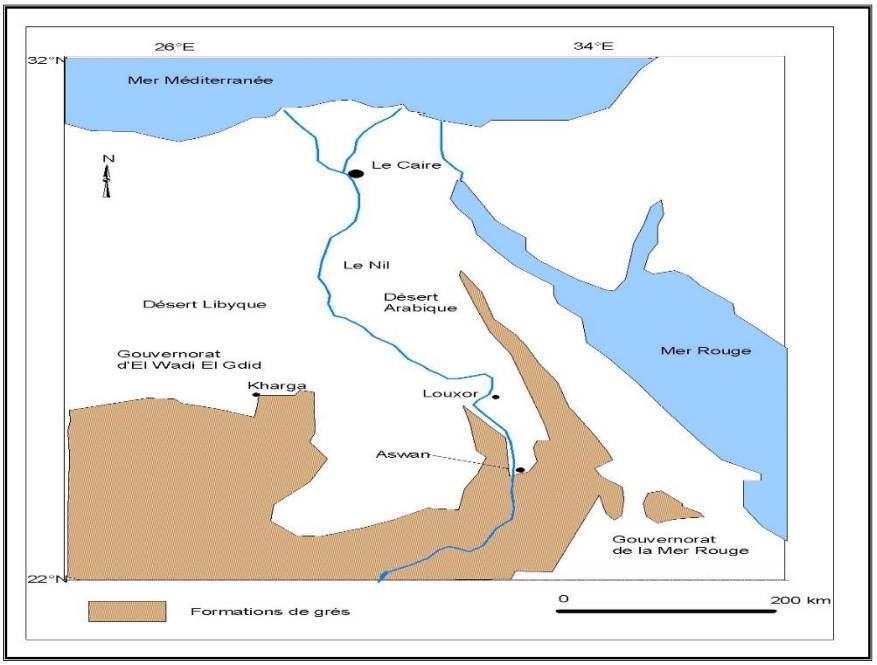
(Photo 2): Mount Al-Sulai'i, consiste of granite (Aswan-Baranes Road, 30 km)

2-3.**Limestone and sand**

The density of sandstone ranges between 1.85, 1.95, and its resistance to crushing ranges from 112 to 264 kg per square centimeter. It absorbs from 9.9% to 11.2% water, and the kaolinite layer, which varies in thickness between the formation of sandstone and metamorphic rock. Microscopic examination of a sample collected in Byblos Bas, located between granite and sandstone, indicates the presence of quartz grains as well as traces of kaolinite and feldspar.

Nubian sandstone formations lie on top of the underlying rocks. These different formations cover large areas, especially the plateau west of the Aswan-Shallal road in Jebel Bass, and near the Aswan Dam, where their thickness generally ranges between 1 meter and 30 metres. They are usually in horizontal layers photo (3).

The sandstone groups constitute the main part of the Nubian formation, as these formations contain interspersed gravel and are generally characterized by a reddish-brown color due to the presence of an abundance of ferruginous cement. The rocks are granular and often contain quartzite pebbles. Sometimes it is interspersed with mud formations near the Aswan Dam on the eastern bank of the Nile River. Microscopic examination of a sandstone sample showed that it consists of circular or semi-circular grains, quartz, and sometimes clay, and these characteristics dominate the formations of the Tallet El-shikh Mountain area.



(Figure 3): Sandstone formations in southern Egypt

(Photo 3): Nubian sandstone formations in Aswan

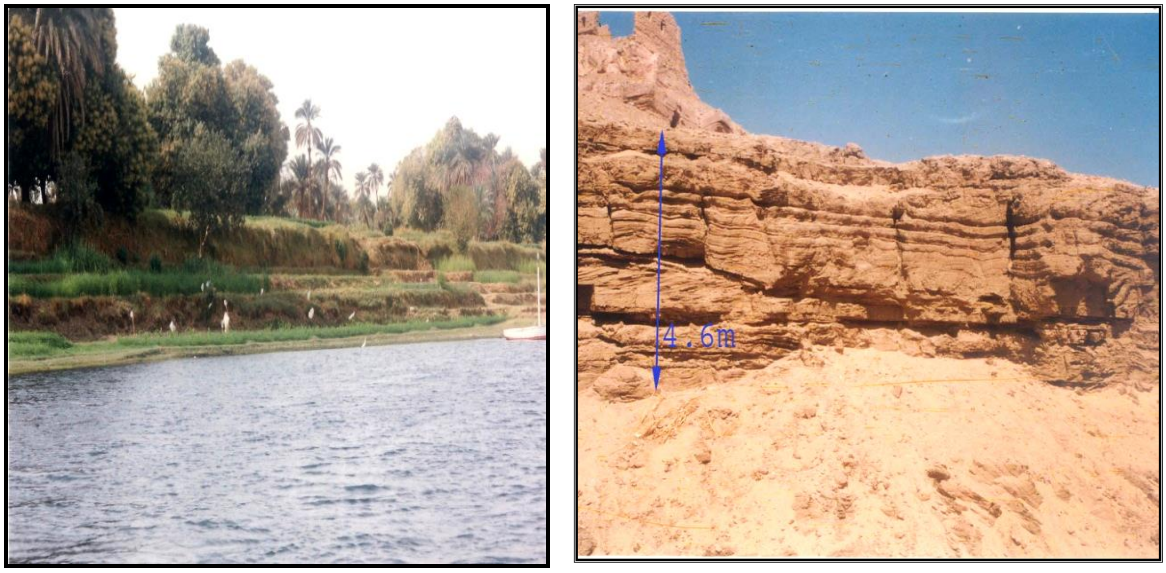
2-4.Nile deposits:

The Nile Valley consists of four types of sediments, f. This formation rises from 10 to 30 m above the modern plain where this formation was observed between 30 m in Wadi Halfa, 15 m in Annaba, 10 m in Aswan, 8 m in Kom Ombo and 6 m in Luxor in the north that was deposited during the annual floods before the construction of the High Dam. The age of the ancient silt in the Nile was estimated at more than 100 million years, and the amount of sediment changed according to the flow of the Nile. The rate of accumulation ranged from 8 cm/century during the period from 641 to 1230, and 6.8 cm during the nineteenth century.

(Table 1) Percentages of sandstone formations at Swan

Depth(cm)	Alluvial%	Fine sand%	Coarse sand %	Calcium carbonate %
0-25	65,50	28,75	3,09	2,46
25-50	66,00	26,78	4,8	2,8
50-100	53,00	44,49	0,3	2,05

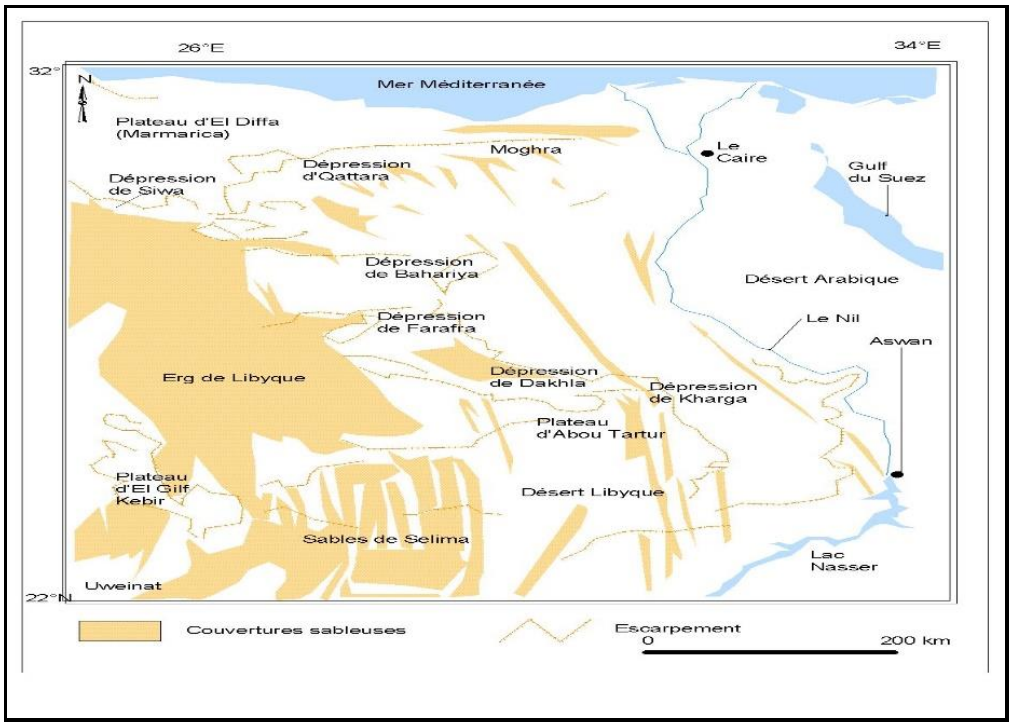
The above table shows that the percentages of melt and fine sand are the most important in the formation of the alluvial plain, i.e. 76.25% of clay deposits and fine sand in the upper layer, 68.28% of clay and sand in the middle layer and 79.99% of fine clay and sand in the lower layer. At the same time, it was found that the percentage of calcium carbonate is 2.48% in the upper layer, 2.25% in the middle layer and 2.21% in the lower layer.



(Photo 4) Ancient sediments (right) and modern sediments (left) of the El-Mil River in Aswan

2-5.Sand formations and sand drift towards the Nile watercourse:

The Western Desert presents itself as an enormous plain covered with coarse sand. The thickness of this sand formation is about 30 cm on average and is characterized by its movement. It reaches Aswan on the western side, where we notice the sand drift on the left bank of the Nile River west of the city. Map No. 3 shows the source of the sand from the desert. West and southeast towards the Aswan region, and as the picture shows, the sand drifts towards the river's watercourse.



(Fig. 3): Sand formations in the Western Desert towards Aswan, southern Egypt

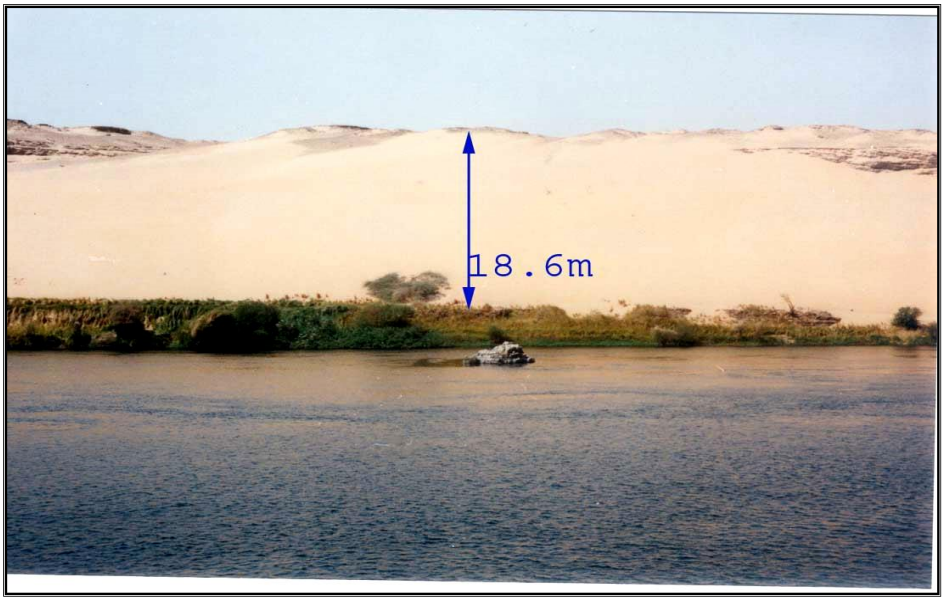


Photo 4): The sandy drift towards the Nile River from the western side, opposite the city of Aswan

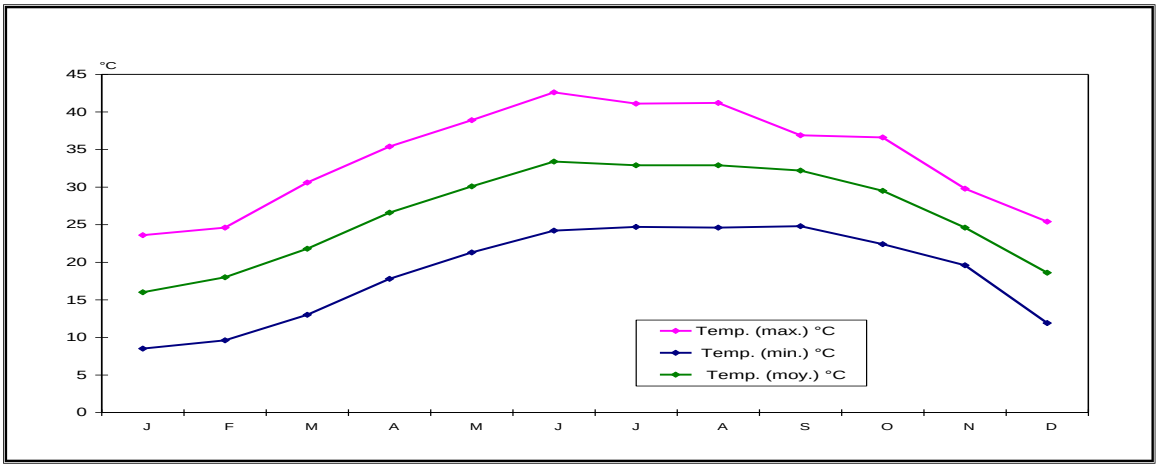
3. The general climate in Aswan

Is one of the environmental factors that affect the tourist attractions or not. The Aswan region is considered a hot region, especially in the summer, and moderate in the winter, and is characterized by a dry climate in general. The climatic distinction can be distinguished by alternating between two main seasons: dry summer and relatively cold winter. Therefore, we find tourist activity, especially from outside Egypt, in the winter. The following table and the attached figure show the temperatures. During the seasons of the year.

(Table 2) The monthly average of temperature, precipitation and evaporation in Aswan

الشهر	يناير	فبراير	مارس	ابريل	مايو	يونيو	يوليو	اغسطس	سبتمبر	اكتوبر	نوفمبر	ديسمبر	السنه
التساقط(mm)	0	0	0	0,5	0	0	0	0	0	0	0.1	0.1	0,5
الحرارة (°C)	16	18	21,8	26,6	30,1	33,4	32,9	32,9	32,2	29,5	24,6	18,6	33,4
التبخر (mm)	304	310	317	330	341	348	346	346	346	338	325	310	346

Source: Aswan Meteorological Station



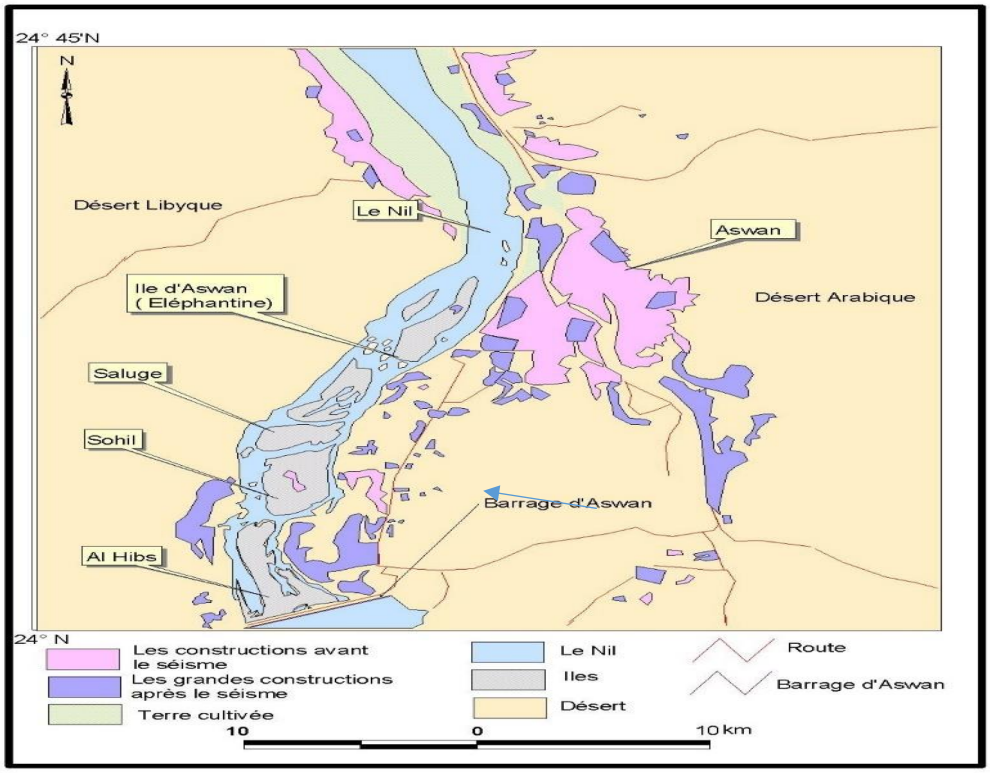
(Fig. 5): The monthly curves of the maximum and minimum temperature in Aswan

3-1. Natural reserves in Aswan (Saluga and Ghazal):

Aswan is a governorate with a special character in its picturesque natural sites, and it is a station that attracts and draws the attention of the world's attention to enjoy the magic of nature and its hot sands. Among the most famous of those who came to Aswan and whose love for it was linked to the point that they buried him in its sands, is the Japanese Emperor, the late Prince Takamado, and the Crown Prince of Japan at the time. He spent the happiest days of his life on Saluja and Ghazal Island, south of Aswan, and in commemoration of his memory, Japan established a center in the "Saluga and Ghazal" Reserve, which is considered one of the most beautiful and smallest natural reserves.

3-2.The importance of natural reserves in tourist attraction and the role of government institutions in maintaining them.

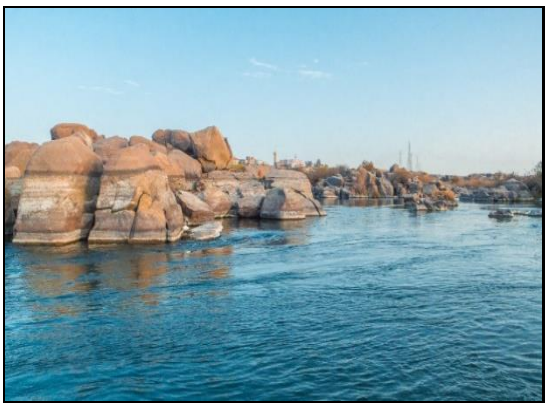
Saluga means waterfall in the Nubian language, and it takes its name from them. It consists of two syllables: "Sa", which means the level of the Nile, and "Oja", which means the noise of the water. As for Ghazal, it is the name of one of the ancient plants that used to grow on these islands, and it is not the known animal. It is two islands close together in the Nile River, and it is considered the smallest natural reserve in Egypt at all, as the area of the two islands is 55 acres, which is equivalent to 0.231 km2.



(Figure 5) Saluga and Ghazal reserves in the course of the Nile River in Aswan

(Photos 5): Saluga and gazelle reserve in the Nile River opposite the city of Aswan

The reserve is located approximately 3 km north of the Aswan Reservoir, and these islands were declared a natural reserve by Presidential Decree No. 928 of 1986, indicating that they are characterized by a special charm due to the picturesque natural landscapes they contain that capture the hearts of their visitors, and their distinguished location in the middle of the Nile provides the opportunity to see... The Nile River flows from south to north as it did millions of years ago.



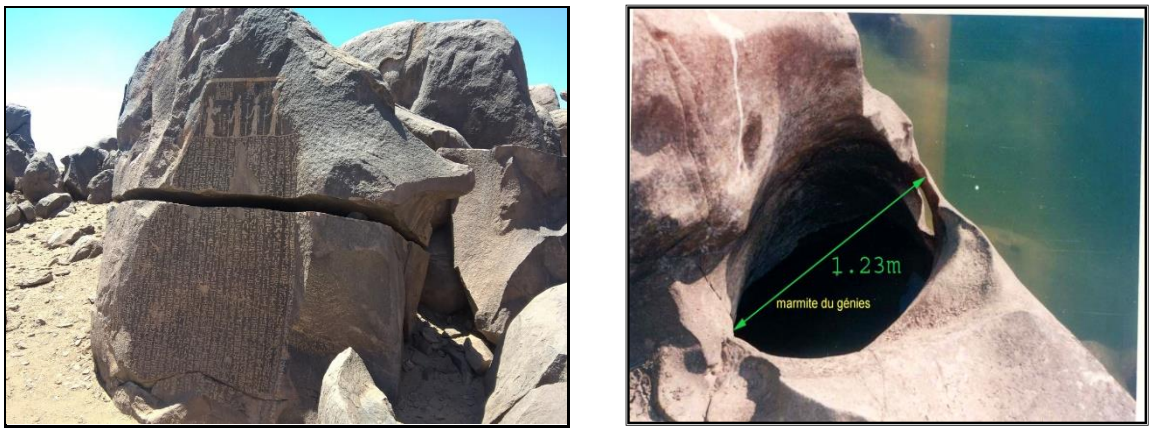
(Photo 6, right and left): Saluga and Ghazal Reserve as one of the geological and biological formations that attract ecotourism.

4. Geological and biodiversity:

Its environment varies between sandy areas, granite rocks, and mud deposits, which enriches biological diversity, as specific types of organisms that live in it characterize each area. This reserve also contains the remaining plants of the Nile Valley that were mentioned in ancient myths and painted on the walls of Egyptian temples. Such as the “Sitt Al Mustah” tree, which is characterized by intense sensitivity and whose leaves shrink when anyone touches them as a form of defense, and the scientific explanation for this phenomenon is that the plant It draws water from the leaves to the stem when it senses danger.

The reserve is considered a stage of youth and maturity for the Nile River due to the strength and speed of the rushing water, the narrowness of the waterway, and the presence of a large number of rocky islands in this area, as the granite rocks in the reserve are more than 500 million years old, and are characterized by the presence of the phenomenon of river varnish, which is the sheen of the rocks in a way that It is clear that it is smooth and shiny, in addition to the presence of many vascular craters in the place, which represent the bottoms of the Nile River. In addition, one of the features of the reserve is the presence of an old quarry that was used in building the second ramp of the Aswan Reservoir in 1934.

It includes the remaining distinctive flora of the Nile River Valley. More than 140 species of plants have been recorded in the reserve. The most important of them are acacia trees, of which there are 5 species in the reserve (it is rare to find this number of acacia species in one place), of which there are 13 species in the Arab Republic of Egypt. As for birds, there are 135 species of resident and migratory birds in the reserve, such as the water chick, the Sultana chick, the white and green condor, the white and black stork, the ibis, and the warbird. Regarding activities in the reserve, there are many activities carried out by the reserve's administration, such as periodic monitoring of birds, environmental awareness, school visits, the work of a herbarium and a seed bank, and providing opportunities for entertainment visits for residents, in addition to visits by foreigners.



(Photo 7 left and right): Granite formations in their attractive shapes for eco-tourism in the Nile islands in Aswan

5. Examples of types of eco-tourism in Aswan:

Desert tourism is considered a new tourism, the demand for which has increased in recent years with the growth of eco-tourism and travel and excursion enthusiasts. This species has a special attraction for nature lovers, as it contains purity, breathtaking beauty, geological treasures, wonderful geographical formations, and fossils that record the eras of history and tell the story of life that became extinct, the forests that disappeared, the rivers that dried up, and the seas that receded before history. Then the formations of mountains and valleys and the movement of sand dunes captivate tourists. The wildlife they see, although sometimes rare, attracts the attention of a large segment of visitors because of the scientific, tourism

and genetic value it reflects. Aswan, with an area of about 62 thousand square kilometers, is considered part of this desert, which is divided by the Nile Valley into a western part, the Western Desert, and an eastern part, which is the Eastern Desert, where trips begin from north to south until Aswan.

5-1.Watching birds:

Due to Aswan's geographical and strategic location on the paths of migratory birds, large numbers of birds arrive there, which migrate to Africa in the winter and return to Europe in the fall. In its flights, it uses known and monitored international routes. Bird watching is considered a high-end form of tourism with high expenditures, in which enthusiasts spend long periods of time living and moving within the country. The specialized tourist can observe hundreds of species on their migration path along the coasts, in addition to enjoying watching what was recorded in ancient inscriptions on monuments and temples, about the interest of the Pharaohs in birds and their connection to their lives and well-being.

(Photo 8): The Nile Islands in Aswan are a station for migratory birds from north to south

5-2.Ecological wellness tourism:

Aswan enjoys the field of environmental healing, especially orthopedic treatment. There are hundreds of natural and sulfur springs and wells, whose water temperatures range between 30 and 73 degrees Celsius, and contain percentages of natural minerals that help in treating skin and rheumatic diseases. There are sand sites with natural and radioactive elements that help in treating psoriasis and rheumatoid arthritis when the body is buried in the sand for measured therapeutic periods. Some natural healing sites with an international reputation have spread in Aswan, which need strengthening, care and preservation of the natural resources on which they depend and which are marketed under the title of environmental healing.

(Photo 9): The western region of the Nile in Aswan as one of the places for environmental healing

5-3. Nile cruises:

Nile cruises are a unique experience for tourists. They enjoy the rural banks of the river with its authenticity and breathtaking beauty along the valley in Aswan Governorate. They are inspired by the creations of Pharaonic antiquities and arts that carried the banner of a great civilization. They also see 144 islands in the course of the Nile and its branches that are declared natural reserves. Hundreds of boats and boats operate in the field of Nile tourism, which need more attention and facilities. This tourism requires the cooperation of many parties to maintain the purity of the river's water and the safety of its course, develop marinas, properly dispose of waste, good management of the islands, regulate the activity of boats and boats, and provide safety throughout trips.

(Photo 9) Nile cruises in Aswan by sailboat

5-4.Green hotels in Aswan:

There is an increasing demand in Aswan for visiting eco-hotels with an architectural style that is compatible with the nature of the region and integrated with it, and is based on serving

the local community interested in eco-tourism. These hotels are chosen in locations with natural beauty and environmental diversity that contribute to tourists coexisting with the natural life of the indigenous people, drawing from their culture and heritage and enjoying mental and spiritual clarity with the splendor of place and time, day and night.

(Photo 10): One of the private hotels for eco-tourism in Nubia, Aswan

6. Recommendations

-Clarifying the concept of geological and environmental tourism in the advanced stages of education

-Developing a Geotourism atlas for all regions of the Arab countries that are characterized by geological and biological diversity

- Quality of products and services

-Marketing the GEOPARKS product

-Providing certified geological guides for the scientific interpretation of geological phenomena

-Reducing human influences during planning

- Applying sustainability concepts to economic development through the ecotourism branch

- Joint tourism programs for Arab countries at the Arab and global levels-

7. Conclusion

The prevailing geomorphological units with their various formations, starting from the bedrock and the Cambrian rocks, passing through the formations of successive geological times, reflect an image of the geological formations of the age of the Earth. Therefore, it is considered a fertile environment for geological and environmental tourism and qualifies to be the largest geological park in Egypt. The waterway of the Nile River has given these geological formations a stunning view in this region, therefore, considers Aswan, specifically in the city and its counterpart on the western shore of the Nile River, to have a great impact on attracting international and national tourism. This, in addition to its cultural heritage throughout the ages, has increased the status of the governorate as a region qualified to attract many tourists, with attention to the human side, especially tourist facilities and tourist personnel. In addition to encouraging investment in this field to develop, the region economically to achieve sustainable development represented in the tourism sector.

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